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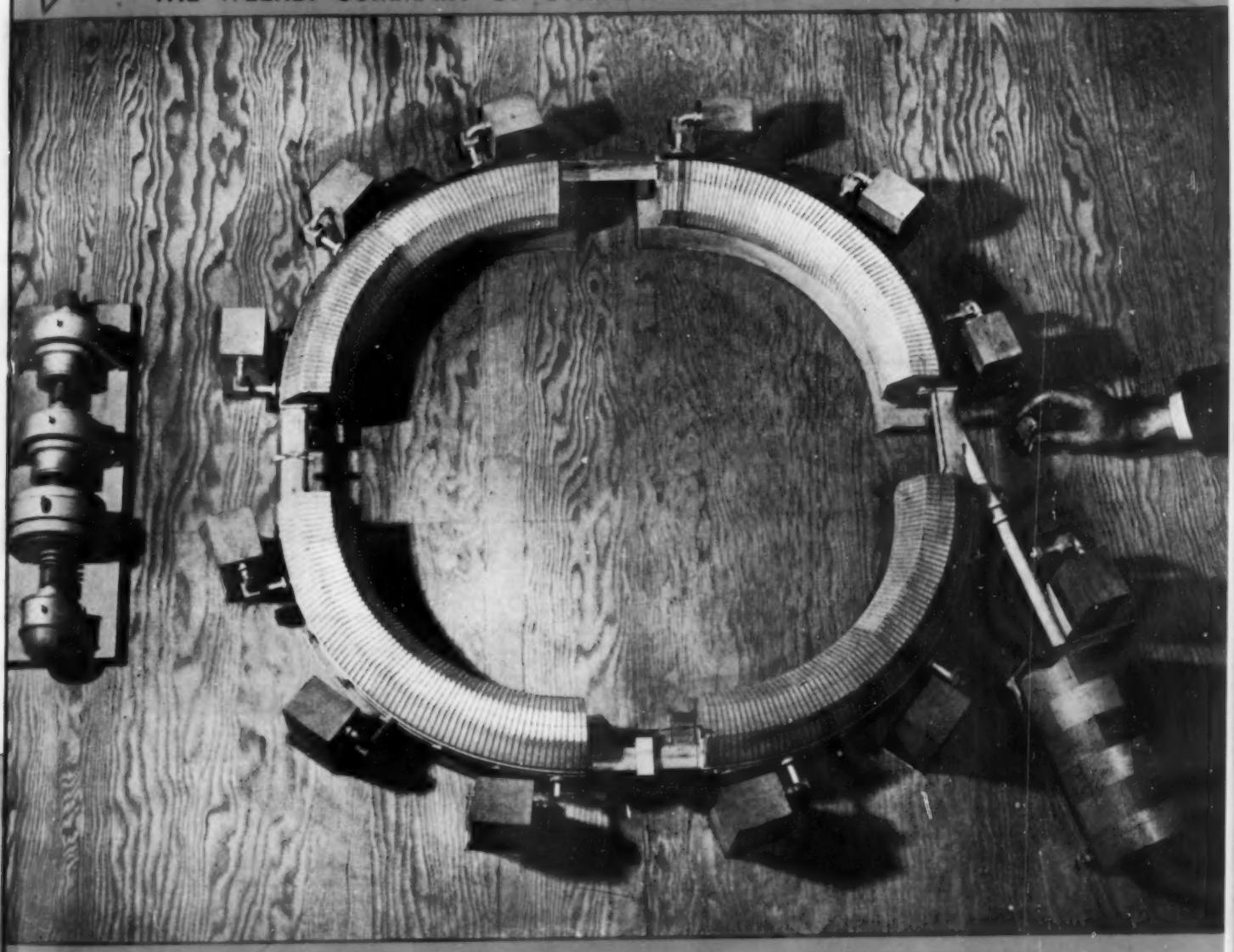
SCIENCE NEWS LETTER

Vol. 53, No. 19

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 8, 1948



Model of a Giant

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A SCIENCE SERVICE PUBLICATION

PHYSICS

Two Giant Atom Smashers

Both promise to operate in the energy range of cosmic rays. They will be built within the next few years with $11,000,000 of A. E. C. Funds.

See **Front Cover**

➤ TWO new gigantic "atom smashers" or electronuclear machines, both of which promise to operate at billions of electron volts in the energy range of the cosmic rays, will be built in the next few years with $11,000,000 of Atomic Energy Commission funds. The largest, a 110-foot cyclotron, will be at the University of California's Radiation Laboratory at Berkeley. The other, a 30-foot synchrotron, will be built at the Brookhaven National Laboratory, Upton, Long Island, N. Y.

California Cyclotron

About ten billion electron volts, enough energy to exceed the most powerful cosmic rays from the depths of the universe, will be produced by the $9,000,000 Berkeley cyclotron.

This will multiply about 20 times the power of the largest cyclotron now operating, the 184-inch atom smasher also at Berkeley, which only a few weeks ago produced man-made mesons for the first time by bombardment with 400,000,000 electron-volt particles.

The new machine will be a gigantic affair 110 feet in diameter with a circular housing around the rim. Atomic particles will speed around it under the influence of 10,000-tons of magnet, like an immense merry-go-round. Protons, the hearts of hydrogen atoms, will be fed into the machine. Mere men operating it will be dwarfed by the apparatus.

The planning for the new giant among atom smashers was under way many months ago. W. M. Brobeck, who did the engineering design of the present world's largest cyclotron, determined that it would be feasible to build and operate a great proton accelerator at ten billion electron volt level.

Dr. Ernest O. Lawrence, whose invention and operation of the cyclotron won him the Nobel Prize, will direct the new one, which will take five years to build. He first announced the possibility of the ten billion electron volt machine at a lecture at Yale's Centennial Celebration of the Sheffield Scientific School last October (*See SNL,* Oct. 25).

Plutonium, the atomic bomb element, was first created in one of the smaller cyclotrons, and so were the other three elements heavier than uranium.

The magnet will be divided into four segments, the four gaps providing access to the accelerating chamber for such equipment as vacuum pumps and the high frequency equipment which accelerates the protons.

As protons pass the accelerating electrode point on each trip around the magnet, they will be struck by a high frequency charge of either 2500 or 5000 volts. With 5000 volts on the accelerating electrode, each particle would make more than one million trips around the chamber before reaching six billion electron volts.

Operation of the great atom smasher will be pulsed; that is, it will operate for about two seconds at a time, then will be turned off for a few minutes.

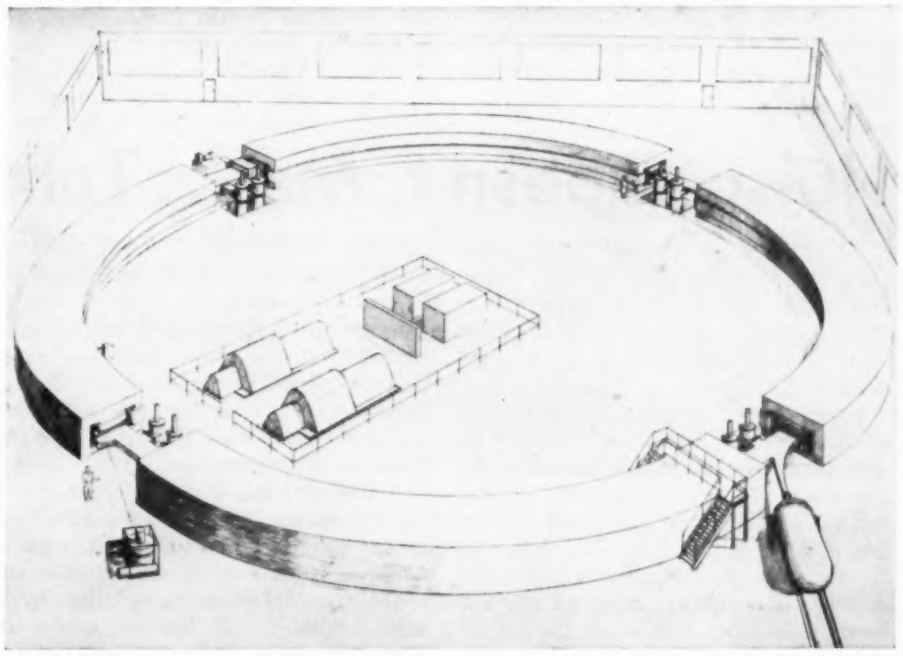
Brookhaven Machine

Three billion electron volts will be the energy of the protons to be accelerated in the 30-foot machine to be built at Brookhaven National Laboratory in about three years at a cost of $3,000,000.

In the operation of the machine, the protons will travel repeatedly around a fixed orbit consisting of four quadrants of a circle 30 feet in radius, alternating with four straight lines about 10 feet in length. The path the protons will follow will have the appearance of a circle flattened at four equally spaced points around its circumference. The total distance travelled in one revolution will be about 230 feet and a proton reaching its peak energy will make about 3.5 million revolutions, a distance of about 150,000 miles. It will travel this distance in less than a second.

The scale model of the three billion volt proton accelerator to be built at Brookhaven is shown on the cover. At top is model of motor generator set which will supply power to the magnet. The magnet is the ring (60 feet across left to right), inside which the particles are accelerated in a vacuum in a "doughnut" shaped course made of a ceramic. Particles are launched at four million volts from the Van de Graaff generator represented at the lower part of the picture.

Design of the Brookhaven machine was by a group headed by Dr. M. Stanley Livingston, on leave of absence from Massachusetts Institute of Technology.



ATOM-SMASHER—Plans for building this gigantic machine are now under way at Berkeley. It will accelerate protons, the nuclei of hydrogen atoms, to 10 billion electron volts. (From SNL, Nov. 1.)

What Machines Will Do

A continuing attack on the fundamental structure of the heart or nucleus of the atom, the prime problem in physical science, is the objective of the new cyclotrons. There is still much to be learned and enticing theories to be tested.

Both equipments will mobilize the most advanced developments in atom smashers in recent years. Particularly important to operation are the concepts proposed in 1945 by Dr. E. M. McMillan, professor of physics in the University of California's Radiation Laboratory, which made possible the synchrotron and synchro-cyclotrons.

In the giant cyclotron, which is sometimes called a synchro-cyclotron, the frequency of the electrical charge used to accelerate particles is slowed down because the speeding particles tend to lag a little at higher energies. Thus the acceleration is synchronized to accommodate the laggard particles.

In the synchrotron, which accelerates electrons, the synchronization is accomplished by increasing the strength of the magnetic field of the ring-shaped magnet. This jerks the lagging electrons up to the accelerating point in time to receive regularly spaced jolts of high energy power.

One possibility of the new giant cyclotrons will be the production of large number of mesons, in pairs, with which it might be possible to fission chemical elements other than uranium, thorium and plutonium with release of atomic energy. This is a theory that scientists are anxious to test. It may possibly give rise to new kinds of atomic bombs or other applications of atomic energy.

Dr. Philip M. Morse, director of Brookhaven, explained:

"Nuclear physics today is in a position of development which can be compared to that of chemistry 50 years ago. At that time chemists knew a great deal about valences and combining weights of elements, but did not know how the forces acted which made molecular bonds. In the last 50 years this has come to be well understood. In nuclear physics today we know that atomic nuclei are held together by some new force—we call it nuclear force—and we know it is not an electrical, chemical or gravitational force, and that it is specifically a nuclear phenomenon. To study and understand this new force we must have instruments which will make or break this force at will under controlled laboratory conditions.

"The best theories concerning this force find it necessary to talk of interchange of charge between particles in the nucleus. This inter-change of charge is supposed to be accomplished by means of a meson which is shared alternately by different particles within the nucleus. With new and higher energy accelerators we hope to be able to gain experimental evidence which will clarify or substantiate these theories, and lead to broad extensions of our present knowledge of the nucleus."

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PSYCHOLOGY

Noise Doesn't Mask Talk

➤ ALTHOUGH a loud continuous noise will "drown out" another noise and make conversation impossible, the effect is entirely different if the masking noise is intermittent, as in a burst of machine-gun fire.

Interrupting the noise cuts down on its effectiveness as a mask, but the extent to which it is cut down depends also on the frequency of the interruption, on the pitch of the drowned-out sound and on the loudness of the noise. This is shown by research at the Harvard Psycho-Acoustic Laboratory reported at the meeting of the Acoustical Society of America in Washington.

If the noise is on and off only once in ten seconds, the conversation can be heard without too much difficulty. But, on the other hand, if the interruption is very high—on and off 5,000 times a second—you can hear almost as well as if there were no noise.

If you are listening to speech accompanied by a noise that is interrupted 300 times a second, the speech will sound intermittent to you, but you will hear practically every word just as if you were listening in a quiet room.

A curious effect was discovered, however, when the investigators tried filling in the intervals between words with a noise. For this purpose they used what scientists call "white noise," that is, a noise containing all the frequencies at random.

Now the speech no longer sounded intermittent. The words were understood just as well as when there was no "masking" noise.

This illusion is like that noticed when you drive past a picket fence. If you are standing still, the pickets block your view so that you cannot see what is behind the fence. But if you are moving at the right speed, and the pickets are not too close together, you will get a view of what is behind the fence and the pickets, if you see them, will appear no more than a vague blur.

The intelligibility of conversation is less, if it comes in abruptly and is chopped off suddenly. You can make out more in the same length of time if it comes in and fades out more gradually.

These investigations were reported to the meeting by Drs. George A. Miller and J. C. R. Licklider of Harvard and Dr. W. R. Garner of the Johns Hopkins University.

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SCIENCE NEWS LETTER

Vol. 53 MAY 8, 1948 *No. 19*

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.

SCIENCE SERVICE

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ASTRONOMY

Earth's Growth Stunted

Theory of arrested growth in youthful period of four planets closest to the sun is advanced by Purdue physicist. They include Mercury, Venus, Earth and Mars.

➤ THE four planets closest to the sun—Mercury, Venus, our own earth and Mars—never quite grew up. Their growth was stunted when they were young. They took on weight, but failed to balloon in size like Jupiter and the other planets farther away from the sun.

This picture of the creation of the solar system is advanced by Dr. D. ter Haar of Purdue University's Department of Physics.

The solar system did probably start from a sun surrounded by a gaseous envelope just as the German philosopher, I. Kant, thought, Dr. ter Haar reasons. Likewise the six planets that have satellites began as bodies with extended atmospheres.

Atmospheres Around Planets

When they were being created, the outer planets were surrounded by atmospheres, but the inner planets had practically none. As a result, today the outer planets such as Saturn and Jupiter are surrounded by extensive satellite systems while the inner planets possess only a few of the known satellites.

The original solar envelope contained between one-tenth and five-tenths of the solar mass, the Purdue physicist calculates.

Three distinct steps followed in the creation of the planets by condensation are reported to be:

1. The formation of nuclei for further condensation.
2. The growth of these nuclei.
3. The capture of additional light compounds by gravitation. The planets are pictured as growing much faster during the last stage when they captured numerous gas molecules than during the first two.

The first two stages, Dr. ter Haar figures, are similar to the formation of drops of moisture in a supersaturated vapor. The temperature determines which compounds are supersaturated at a given density.

In the gaseous disk from which the planets were created, the temperature decreased with increasing distance from the center. Consequently, in the regions nearer to the sun fewer compounds took part in the initial condensation phases than in the outer regions of the solar system.

"It now turns out," Dr. ter Haar states in the journal, *Science,* (April 23) "that in the regions of the solar system where the terrestrial planets are found, only inorganic compounds will condense. In the regions of the outer planets, however, both organic and inorganic compounds can condense. It is very remarkable that the change-over from inorganic to organic compounds lies just in the region between the inner and outer planets."

Two results follow, Dr. Ter Haar calculates. First, there will be fewer condensation nuclei in the inner parts of the system than in the outer parts. Secondly, the specific density of the condensation nuclei in the inner regions will be higher than that of the nuclei in the outer regions. From this alone, we could expect heavy, small inner planets and light, large outer ones.

The inner planets grew more slowly than the outer planets during the first two stages. Therefore the outer planets may well have reached the third stage before the envelope surrounding the sun had dissipated very much. But by the time the inner planets had reached the size that gravitational effects would be important, the gaseous envelope had practically dissipated and appreciable further growth was impossible.

Third Stage of Growth

In the building up of the outer planets, about 20 times as much matter in the sun's gaseous disk took part as was used in the formation of the inner planets. By failing to grow up fast enough, these were cheated out of the third stage of their growth, that of acquiring lighter gases by gravitational capture.

A qualitative analysis such as this, Dr. ter Haar reports, shows that the theory advanced by Kant in the middle of the eighteenth century is stronger than was suspected. It is thus rather satisfying to find, he says, that the differences between the inner and outer planets can be explained by the Nebular Hypothesis, the simplest possible explanation of how the solar system came into being.

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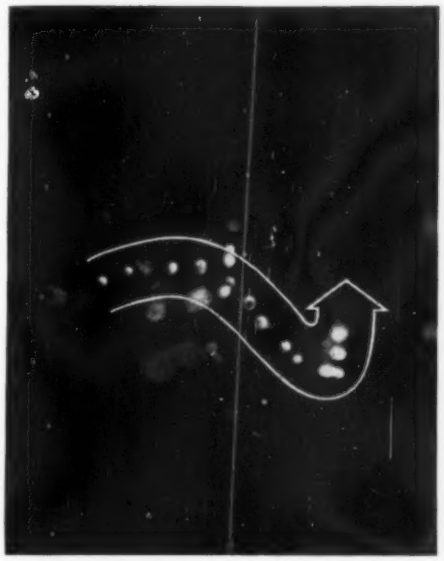

***ELUSIVE ELECTRON**—The first definite tracks of electrons, particles that make up atoms, are shown in this picture, developed after an electron sped through the emulsion, striking silver grains in its path. This shows an enlargement of a 13-grain track. X-rays, filtered through lead, were used to start the electrons flying into this new type of Eastman plate.*

PHOTOGRAPHY

Electron Tracks Captured On New Photographic Plate

➤ ELECTRONS, known as particles of electricity, are the commonest of the fundamental bits of matter, and scientists work with them daily.

Yet only now have electron tracks been definitely photographed. Eastman Kodak scientists announced that tracks about two thousandths of an inch long—less than the thickness of this piece of paper—have been captured in a special photographic emulsion.

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GENERAL SCIENCE

Three Medals Awarded at National Academy Meeting

➤ THREE medals were awarded in absentia to scientists at the annual meeting of the National Academy of Sciences.

Dr. Alexander G. Vologdin, a corresponding member of the Academy of Sciences of the U.S.S.R. and a distinguished scientist of the Paleontological Institute in Moscow, received the Charles Doolittle Walcott bronze medal and award for 1947 for his researches on the

early Cambrian organisms, *Archaeocyatha*.

Dr. Felix Andries Vening Meinesz, professor of geodesy and geophysics in the University of Utrecht and President of the Netherlands Geodetic Commission, was awarded the Agassiz gold medal and honorarium for 1947 for his contributions to oceanography. Prior to the invention of his multiple pendulum apparatus, measurements of gravity could not be accurately determined on unstable ground.

The Henry Draper medal for 1947 was conferred on Dr. Hans Albrecht Bethe, professor of physics at Cornell University, for his quantitative solution for the source of the tremendous flow of energy from the sun and stars.

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GENERAL SCIENCE

New Science Accolades

Elections to National Academy of Sciences and American Philosophical Society include three Nobelists and plutonium discoverer. Fourth woman academician named.

➤ WHEN she was elected to the most exclusive science society in America, the National Academy of Sciences, Dr. Gerty T. Cori, of Washington University Medical School, St. Louis, added this honor of being the fourth woman academician in history to a similar election a few days earlier to the American Philosophical Society, with almost as restricted a membership.

She thus joins her husband fellow-scientist in membership in these two leading societies as well as the Nobel prize given them last fall.

The discoverer of plutonium, Dr. Glenn T. Seaborg, University of California chemist, was another scientist elected to the Academy.

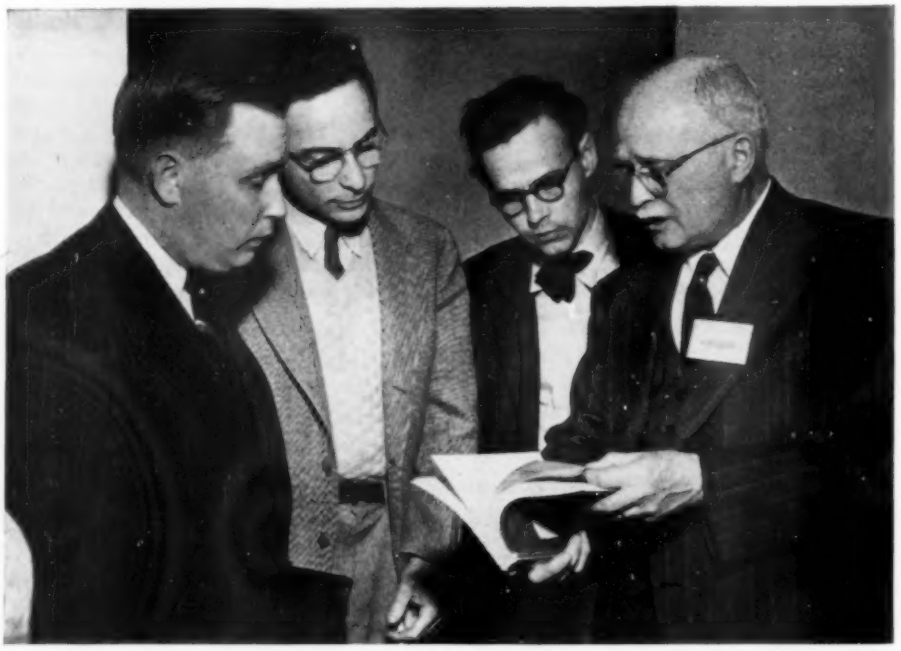
Prince Louis de Broglie, Nobelist and famous French theoretical physicist, and Dr. Ronald A. Fisher of Cambridge, England, leading statistician, were elected foreign associates of the Academy.

The discoverer of the neutron (the atomic particle that is trigger of the atomic bomb) Sir James Chadwick of Liverpool, England, was elected a foreign member of the American Philosophical Society, as was Dr. Otto Lous Mohr, president of the University of Olso.

The physicist-member of the Atomic Energy Commission, Dr. Robert F. Bacher, was elected a member, as was Frederick Osborn, U. S. representative on the UN Atomic Energy Commission, who was made a member in the social science section.

Other new members elected to the National Academy of Sciences are:

Eric G. Ball, professor of biological chemistry, Harvard Medical School; Lloyd V. Berkner, chairman of the Section of Exploratory Geophysics of the Atmosphere, Carnegie Institution of Washington; Felix Bloch, professor of physics, Stanford University; Hallowell Davis, director of research, Central Institute for the Deaf, research professor of otolaryngology, Washington University; John R. Dunning, professor of physics, Columbia University; W. Maurice Ewing, head of department of geophysics, Columbia University; Karl Folkers, assistant director of research, Merck and Co.; Thomas Francis, Jr., professor of epidemiology and chairman of the department, School of Public Health, University of Michigan; Edwin R. Gilliland, professor of chemical engineering, Massachusetts Institute of Technology; Haldan K. Hartline, associate professor of biophysics, Hospital of the University of Pennsylvania; Ernest R. Hilgard, chairman of the department of psychology, Stanford University; Frank L. Horsfall, Jr., member, Rockefeller Institute for Medical Research; John R. Johnson, professor of chemistry, Cornell University; Raymond A. Kelser, dean, School of Veterinary Medicine, and professor of bacteriology, University of Pennsylvania; Cyril N. H. Long, chairman of department of physiological chemistry, Yale University School of Medicine; Edward J. McShane, professor of mathematics, University of Virginia; Donald H. Menzel, chairman of department of astronomy, Harvard University, associate director for solar research, Harvard College Observatory; C. W. Metz, chairman of department of zoology, University of Pennsylvania; Curt P. Richter, associate professor of psychobiology, Johns Hopkins University; Hermann I. Schlesinger, professor of chemistry, University of Chicago; Francis O. Schmitt, head of department of biology and biological engineering, Massachusetts Institute of Technology; Gilbert M. Smith, professor of botany, Stanford University; Curt Stern, professor of zoology, University of California; Chester Stock, professor of paleontology, California Institute of Technology; James B. Sumner, professor of biochemistry, Cornell University; Edward Teller, professor of physics, University of Chicago; Kenneth V. Thimann, associate professor of botany, Harvard University; Charles A. Thomas, executive vice president, Monsanto Chemical Company.



ACADEMY MEETING—Among the scientists attending the annual meeting of the National Academy of Sciences were (left to right): Dr. Th. G. Sahama, visiting Finnish scientist at the Geophysical Laboratory, Carnegie Institution of Washington; Dr. Felix Chayes, Geophysical Laboratory, Carnegie Institution of Washington; Dr. K. J. Neuvonen, visiting Finnish scientist at the Geophysical Laboratory, Carnegie Institution of Washington; and Dr. W. H. Bucher, professor of structural geology, Columbia University.

NOBELISTS ATTEND ACADEMY MEETING—Three Nobel prize winners who attended the National Academy of Sciences meeting were (left to right): Dr. Niels Bohr, physicist, Institute for Theoretical Physics, Copenhagen, Denmark; Dr. J. Franck, professor of physical chemistry, University of Chicago; and Dr. Otto Stern, physicist, Carnegie Institute of Technology.

Other scientists elected new members of the American Philosophical Society include:

Farrington Daniels, physicist, University of Wisconsin; Zay Jeffries, metallurgist, General Electric Co.; Samuel S. Wilks, professor of mathematics, Princeton University; Vladimir Kosma Zworykin, television inventor, RCA Laboratories; Elmer G. Butler, chairman of the department of biology, Princeton University; Chester Ray Longwell, professor of geology, Yale University; Eli K. Marshall, professor of pharmacology and experimental therapeutics, Johns Hopkins University; Louis L. Thurstone, professor of psychology, University of Chicago; Cornelis Bernardus Van Niel, professor of microbiology, Stanford University.

Dr. Edwin G. Conklin of Princeton was elected president of the American Philosophical Society.

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PHYSICS

Spying on Growing Cells

New kind of microscope, which may uncover many important facts about life processes, color "stains" with light waves without harming the living cells.

➤ COLOR "staining" with light waves without killing the living cells is a new microscopic technique that is expected to reveal much about important life processes.

This new kind of microscope, a further development of the phase microscope, will permit man to spy upon cells as they grow, multiply and carry on their important life functions. It will let scientists see in color, for the first time, both normal and cancerous growth, and may help them discover what the abnormal growth is.

But this latest development in microscopy is still very much in the experimental stage. Many refinements may be expected before instruments of this type are made available to scientists for important research.

The instrument, reported to the National Academy of Sciences meeting in Washington, was developed by Dr. F. Zernike, the Dutch physicist who visualized and made the first phase microscope. Dr. Zernike, professor of physics at the University of Groningen, the Netherlands, this year is visiting professor of physics at the Johns Hopkins University in Baltimore.

The ordinary phase microscope uses two transparent rings to reveal, in black and white, details heretofore unknown concerning delicate cell structure. Two optical companies are now making instruments of this type available commercially in America.

The phase ring separates a small portion of light and distributes it over the whole field. It works because it takes advantage of the fact that light travels in waves.

This separated light, spread over the whole image, promises an evenly illuminated background. The image appears bright where the phase of the direct light is the same as that of the background light so that it is reinforced. It shows dark when the phases of the two light parts are different so that by interference they destroy each other.

In the new color phase microscope, the ring works in an opposite way in the red than in the green end of the spectrum, giving some details more red light, others more green, depending on their thickness.

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BIOLOGY

Cytoplasm Chooses Genes Actually To Be Developed

➤ GENES, the still-unseen chemical units that determine heredity in animals and plants, are not necessarily as omnipotent as some biological thinking would hold them to be, Dr. T. M. Sonneborn of Indiana University suggested. The cytoplasm, or general protoplasm of the cell, can have something to say about what the offspring will be like, he declared at the meeting of the National Academy of Sciences in Washington.

His studies of the one-celled animal form known as Paramecium indicate that while the genes do determine what characters the coming generation may possess, the cytoplasm "picks out" the ones that are actually going to be developed. This is possible in Paramecium because in these primitive creatures the cytoplasm is a well-developed, active part of the organism when the new generation gets its start. In the beginning-cells of higher animals and plants the cytoplasm is new, undeveloped, "inexperienced," hence has little or nothing to say about the fate of the genes.

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GENETICS

Mother-Daughter Conflict Seen in Some Plant Seeds

➤ THE mother-daughter conflict often dramatized by playwrights and novelists has a curious counterpart in the plant world, where a plant will go through all the trouble of forming a seed—and then prevent the seed from ever sprouting. At the meeting of the National Academy of Sciences in Washington, Dr. H. A. Brink of the University of Wisconsin called attention to this peculiar situation.

A seed, Dr. Brink reminded his audience, is really a mosaic structure, composed of at least three different kinds of tissue from the genetic point of view. The tiny embryo plant within, waiting its chance to grow, is definitely the offspring generation. The tough outer coats that cover it are really parts of the mother plant's body-substance. And the "lunch" of stored food in the seed, technically known as the endosperm, is neither one nor the other, but an entity of its own.

It often happens, especially in the seeds of hybrid plants, that the maternal structures in the seed-coat do not make way when the embryo is ready to start developing and make its own way in life. Frequently, when some exceptionally valuable hybrid seed develops this difficulty, it becomes necessary to break down this "parental objection" by outright force, to give the new generation its chance to grow.

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PLANT PHYSIOLOGY

Piled-Up Food Checks Plant Growth Efficiency

➤ THE little green food factories in the leaves of plants have the same kind of difficulty that their larger man-made counterparts sometimes run into—their product tends to pile up faster than it can be removed and used up, with resulting interference with operational efficiency.

This picture of bottlenecks in natural production processes was presented before the meeting of the National Academy of Sciences in Washington by Dr. F. W. Went of the California Institute of Technology. The experiments he reported were made on tomato plants, but general conclusions based on the results are applicable elsewhere in the plant kingdom as well.

Green plants need a lot of light before they produce enough food to use in growth, Dr. Went found. An illumination of 1,200 foot-candles proves a limiting factor.

But this gets crossed up with a temperature effect, which cuts the amount of sugar transported within the plant as it gets warmer. Since the plant receives both light and warmth from the sun, simultaneous increases in both kinds of radiation often work at cross-purposes. If the temperature remains high at night, as it does in a greenhouse, night growth is seriously hampered because the necessary materials cannot reach the growing points fast enough.

A practical way to overcome this handicap is to sprinkle sugar solution on plants in the greenhouse at night. They readily absorb the sugar through their leaves, and thus have more food material which can be built into the substances needed by the plant for its growth.

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ELECTRONICS

New Cesium Vacuum Tube Changes Electric Current

➤ A NEW vacuum tube for changing alternating into direct current, applicable to 110 volt supply such as used in ordinary commercial service, was announced to the National Academy of Sciences, meeting in Washington, by Dr. A. W. Hull of the General Electric Company.

This rectifier uses cesium metal both as coating for the hot cathode and as current-carrying vapor. This double use of cesium gives the highest efficiency theoretically obtainable in a thermionic rectifier, combined with unlimited life.

For rectifying and controlling currents at high voltages, Dr. Hull also described a new high-voltage thyratron, which will be used in power supply for television transmitters and for direct current power transmission. A new and efficient long-life cathode for thyratrons, which will handle currents as high as 5,000 amperes, was also described.

A new method of detecting and measuring atomic disintegrations that are of such low penetrating power that they can not escape from the vacuum chamber was described by Dr. Samuel K. Allison of the University of Chicago. He compared this atom study to measuring what happens by observing the recoil of a gun instead of following the flight of the bullet. An electron multiplier tube is used and its recording depends upon electrons being ejected from metal surfaces when they are hit by the primary particles.

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IN SCIENCE

PUBLIC HEALTH

We'll Be Lots Healthier Ten Years from Now

➤ AS a nation, we will be much healthier 10 years from now if we follow the 10-year plan expected to be drawn by the National Health Assembly, which held its meeting in Washington recently.

And if everybody gets together and cooperates on the plan, we can start showing improvement a lot sooner, Oscar V. Ewing, Federal Security Administrator, told a nation-wide radio audience. Mr. Ewing spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

More and better sanitation, more hospitals and health centers, more doctors, nurses and other health personnel, and more research to fight such chronic diseases as cancer, heart disease and mental illness are needed to improve our health, Mr. Ewing said.

"A breakdown of the statistics shows that good health varies widely among the states of the Union and even among the localities within the different states," he pointed out. "It varies also as to age-groups and income levels. As for public health services, federal funds, you know, are appropriated in relation to the money the various states and communities can themselves raise, and the poorer states and communities get the short end of it.

"Nearly a sixth of our entire population is afflicted with chronic disease. And outside of all the suffering and misery this entails, we have to realize that we are losing at least a billion workdays every year from this cause. Diseases of the heart alone cost the American people a billion dollars annually and mental diseases another billion and a half."

"We take sanitation too much for granted," Mr. Ewing continued. "More than six million persons live in towns and cities which need new sewerage systems. Over 79 million need improved systems. And today only about six and a half million people are served by systems that could be termed really adequate. And this doesn't include the even worse conditions in our rural areas."

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NCE FIELDS

GEOLOGY

Earth's Early Magnetism To Be Tested with Clays

➤ HOW the compass would have pointed a hundred million years ago—if the compass had existed then—will be discovered this year by an expedition of the Carnegie Institution of Washington to collect clays from the western United States from Colorado to Washington.

Just why the earth is a giant magnet is still one of the major mysteries of science, Dr. E. A. Johnson of the Carnegie Institution told the American Physical Society meeting in Washington, despite the fact that scientists are now sure that earth had a magnetic field at least a million years ago.

What amount to tiny magnets in the clay particles laid down in ancient glacier lakes or on the ocean bottom can be used to determine the strength and direction of the magnetic field when the clay beds were formed.

Glacial clays from New England and sediments from the bottom of the Atlantic and the Pacific formed a million years ago have been collected by the scientists. Pieces of the material are spun near a coil and extremely sensitive amplifiers are used to pick up the very small voltages generated. From these there can be figured the strength of the earth's magnetic field in which they were deposited.

A million years ago the earth's magnetism was just about what it is now. Seeking clays of earlier geological ages, the scientists will find records of the earth's magnetism still earlier.

Science News Letter, May 8, 1948

ENGINEERING

Radar Technique Enters Land-Surveying Field

➤ AN optical radar for surveying earth surfaces has been developed, the International Scientific Radio Union was told at its meeting in Washington by W. W. Hansen, Illinois Institute of Technology, Chicago. It sends out pulses of light which are reflected back from the point whose position is to be determined, and the distance is measured by the time the light takes to travel forward and back.

The light returning from the reflector falls on a photo-multiplier whose output is amplified to produce a pip, an illuminated spot, on a cathode-ray tube. Determining the distance by the transit time of the pulse of light is accomplished by auxiliary circuits which include a local crystal-controlled oscillator. The circuits produce timing markers on the tube which can be made to match the pip produced by the returning light.

Angles are measured as with the conventional surveyor's transit. The optical system makes use of a single parabolic searchlight mirror, the outer portion of which is used for the transmitted beam, while the inner portion is used for the returned beam. The equipment is portable and operates alternatively from storage batteries or from 110-volt alternating current.

Science News Letter, May 8, 1948

AERONAUTICS

Sound Waves Measure True Airplane Speed

➤ TRUE airplane speed may be measured accurately by high frequency sound waves, the Acoustical Society of America was told at its meeting in Washington by Victor B. Corey, of Frederic Flader, Inc., North Tonawanda, N. Y. The Mach number, the ratio of plane speed to the velocity of sound, can also be measured by the same means.

The instrument, developed for the purpose, was described by the scientist as using the convection refraction of high frequency sound waves sent out from an extensible boom carrying a device to give out sound waves. True air speed, which involves the ratio of distance to time, is proportional to the ration of boom extension to a measured acoustic transit time which remains constant excepting for temperature changes of the air.

The device is made automatic by what is called a servo-positioning mechanism which moves the boom in response to a signal from a dual receiver in a fixed parallel boom. The basic operating principles, he stated, are applicable in general to velocity or Mach number measurements on a body which moves through any fluid medium of low viscosity.

The measuring instrument, developed at Cornell Aeronautical Laboratory under contract with the U. S. Navy, is named STAMNI for short, the full name being Sonic True Air Speed and Mach Number Indicator.

Science News Letter, May 8, 1948

GENERAL SCIENCE

Two New Trustees Elected To Science Service

➤ DR. KARL LARK-HOROVITZ, chairman of the department of physics of Purdue University, Lafayette, Ind., and Charles E. Scripps of Cleveland, Ohio, have been elected new trustees of Science Service, the institution for the popularization of science, with headquarters in Washington.

Mr. Scripps represents the E. W. Scripps Estate of which he is a trustee, while Dr. Lark-Horovitz represents the American Association for the Advancement of Science of which he is general secretary.

The following officers were renamed in annual meetings just concluded:

Dr. Harlow Shapley, *President,* Director of Harvard College Observatory, Cambridge, Mass.; Dr. Alexander Wetmore, *Vice-President and Chairman of the Executive Committee,* Secretary of Smithsonian Institution, Washington, D. C.; O. W. Riegel, *Treasurer,* Director of Lee School of Journalism, Washington and Lee University, Lexington, Va.; Watson Davis, *Secretary,* Director of Science Service, Washington, D. C. Additional members of the Executive Committee are Frank R. Ford, Editor, Evansville Press, Evansville, Ind.; and Dr. E. G. Conklin, Princeton University, Princeton, N. J.

Science News Letter, May 8, 1948

MEDICINE

Medical War Crimes To Be Outlawed Internationally

➤ MEDICAL war crimes will be outlawed ethically, if the newly-organized World Medical Association carries out its present plans.

Doctors all over the world, according to this plan, will take an oath refusing to perpetrate experimental and non-experimental crimes and human barbarities such as German physicians were involved in during World War II. They will take this oath when they receive their degrees of doctor of medicine, just as U. S. physicians now take the age-old Hippocratic oath on receiving their medical degrees.

Adoption of this oath was urged in a resolution by the World Medical Association at its first meeting in Paris last September. Approval of the resolution is expected from the association's council at its meeting in New York.

Science News Letter, May 8, 1948

AGRICULTURE

Seeds Are Sown by Planes

This program gives promise of more meat through creation of larger grazing areas and more lumber by protecting forest sites against erosion.

By RON ROSS

➤ AIR RAIDS over the western United States are helping solve two of the nation's toughest problems: food and housing.

The bombs carried on these peaceful forays are seeds. Bombing seeds on vast areas of the West is an attempt to link the modern air age with the sowing of seeds, one of man's most ancient occupations.

Seeding from the air is standard procedure in some special jobs such as sowing California rice fields. Other large-scale applications of aviation to the farm include dusting crops with new chemical enemies of plant pests. Promising new uses of planes in agriculture are being explored.

Experiments now under way with aerial seeding give promise of fighting both hunger and the shortage of housing.

Increase Meat Production

More meat will be produced on vast grazing areas because of grass seed showered from the air.

More lumber for future homes may come from trees to spring from seeds dropped from planes.

Fighting forest fires from the air is now a common practice. Rangers drop by parachute into a blazing area just as paratroopers descend upon an enemy. The added aerial touch now is the use of airplanes to restore the precious ground cover after a disastrous forest fire.

After the last embers of a blaze have died out and ashes and charred stumps are all that remain of a once valuable forest, the danger is not over. A rain may wash away the unprotected topsoil and keep the site from ever again being a useful forest. The only defense against erosion of the irreplaceable soil is a quick seeding job. This gives the land a protective cover of plants until new trees can be planted and grow big enough to hold the soil, a matter of years.

Planes are now used to drop the seeds of forage plants over the forest ruins, preserving the land for future timber crops. Even if it were possible to mobilize men and equipment at the frequently remote location of burned forests, a quick rain might wash off priceless soil before a cover could be planted on the ground. But aerial seeding, covering many acres per minute, is saving thousands of acres of future forests.

Trees in some of these forests may spring from seeds dropped by planes.

The ruins of the great forests in Maine which were destroyed in last fall's disastrous fire which wiped out cities, palatial summer homes and a famous cancer research center as well as forests are the testing ground for an experiment which may revolutionize the replanting of forests. In the midst of the timberland swept by the blaze was a large experimental area of the Forest Service of the U. S. Department of Agriculture. Planes rained white pine seed on 2,200 acres of this area in mid-February. If this seeding is successful, it can mean cheaper, faster tree planting on thousands of acres of land each year.

Forest Service scientists will move into the recently-seeded area in a few weeks to make the first survey of their "catch," the young trees which have come up since the aerial sowing in February. More definite results will not be available for as long as five years, until the stand of seedlings has had time to develop into a young forest.

Across the country from the charred forests of Maine, direct seeding of trees from the air has taken on a new twist in the Pacific Northwest. A helicopter, hovering low over the timber-growing hills of northwestern Oregon, rained seed of five different kinds of trees on areas to be reforested.

Helicopter Experiment

The helicopter experiment was conducted by the Crown Zellerbach Corporation, a producer of pulp and paper, last December. In a few hours of flying time, 2,500 acres of land were seeded for trees from the "egg beater." Here, again, foresters will not know the success of the experiment for several years.

Seeding from the air is actually the oldest method of reforesting. In nature, millions of seeds are scattered. Only a few become trees. If dropping seeds from planes is to be practical, it must be more efficient than Nature, because of the cost of seed.

One way to help use less seed is to fight the rodents such as ground squirrels which will eat the seeds. Poison bait dropped from planes before an area is to be seeded has been used. Another method under experiment is the use of rodent-repellents on the seeds.

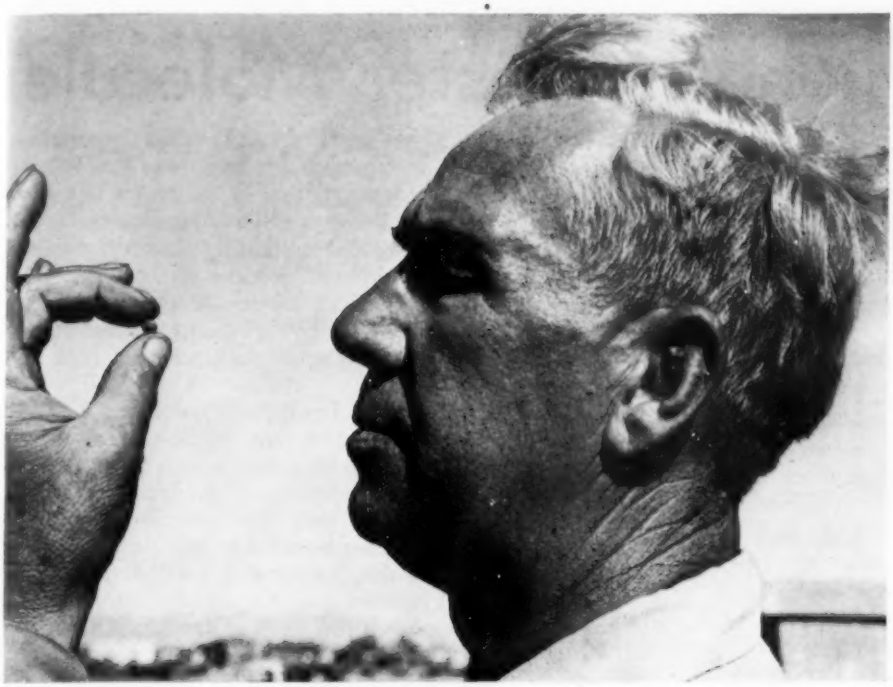
Building Future Forests

Forest Service scientists declare that planes will play an important role in building future forests. Dropping tree seed from planes is still experimental, but it offers a hope for regaining much of America's depleted forest resources faster and at less cost than any other method.

While planes soar over the forests, helping raise the lumber for tomorrow's homes, another air conquest is being made on dry, near-desert lands of the West. Hundreds of thousands of acres of land have been seeded with grass from the air.

There are millions of acres which might feed more cattle—and put more

AERIAL SEEDING—At a signal from the flagman, the pilot pulls the trigger which releases seeds. The seeds are pellets being dropped over grazing land in Arizona.



DEVELOPED PELLETS MADE OF SOIL—Dr. Lytle S. Adams of Tucson, Ariz., has improved this system of scattering grass seed from the air by using pellets containing seeds, fungicide, insect and rodent repellents, fertilizer and moisture.

meat in your butcher's shop—if grass could be seeded.

Scattering grass seed from the air is called "ordinary broadcasting." The seed is simply dropped. Some of it "catches on" and becomes grass. Much of it does not. Yet this simple method has proved "more than reasonably successful" on more than half a million acres of potential grazing land in experiments directed by Department of Interior scientists.

A method of getting more even seeding with fewer seeds has been developed by a retired dental surgeon in Arizona, Dr. Lytle S. Adams. He uses pellets made of soil. Inside the pellet are seeds, fungicide, insect and rodent repellents, fertilizer and moisture.

The Department of Interior has spent $300,000 in the past three years experimenting with Dr. Adams' pellets for aerial seeding. Approximately 146,000 acres have been sown.

Making the pellets and dropping them so that grass will grow have proven difficult problems. First seedings on Indian lands in Arizona were followed by a severe drought. Selection of the proper soil to use in the pellets has been a problem. In some cases seeds began to sprout before they were dropped from the plane.

But the stake in this and other attempts to seed range lands of the West quickly and cheaply is great. Millions of acres of now-idle land might produce millions of pounds of beef for a hungry world. This land must be seeded quickly at the right time and more cheaply than it can be done on the ground.

Air raids which brought death and destruction in the war are now bringing life in seeds for lumber and food.

Science News Letter, May 8, 1948

With a new *camera* recently patented, snapshots can be taken either in black-and-white or in color simply by turning a knob.

ENGINEERING-AERONAUTICS

Periscopic Sextant Aids Finding Plane's Position

➤ PERISCOPES on airliners, similar to those used on submarines, make it possible for navigators to determine their positions by sextant readings on celestial bodies without the customary viewing bubble projecting above the surface of the plane.

The so-called periscopic sextant, already installed on the Clipper Paul Jones, now flying between New York and Calcutta, has proved satisfactory in a dozen trips across the Atlantic, Pan American World Airways revealed.

The periscopic sextant combines in one delicate instrument the periscope and the bubble sextant. Attached to the ceiling of the flight compartment, it permits the navigator to scan the heavens without the necessity of climbing into an astrodome or viewing bubble. His view of the stars is obtained through a small tube which pokes up a few inches through the metal skin of the plane, and which is so arranged that it can be rotated to give a complete picture.

Another advantage of the periscopic sextant is the lessening of drag on the plane by the elimination of the projecting astrodome. The instrument was developed by the Kollsman Instrument Co., Elmhurst, N. Y., originally for Pan American's version of the Boeing Stratocruisers, which are now on order.

Science News Letter, May 8, 1948

Do You Know?

Fertilizer in the garden should not be put in contact with seed.

The egg of a *grasshopper* is small; its shell contains a waxy material.

Rye, whole wheat, barley and corn, in that order, follow oats and rice in nutritional quality of their *proteins*.

The government has listed some 57 jobs which *airplanes* are doing in addition to their usual uses; these jobs range from aerial surveys to cattle roundups.

The importance of *soybean* in America is evidenced by the fact that production was 20 times as great in 1947 as in 1930; the 1930 crop was 9,000,000 bushels, the 1947 crop was 181,000,000 bushels.

GENETICS

Gene Is Master Molecule

➤ EVOLUTION of plants, animals and man is controlled by master molecules, which can either build up greater complexity or by dropping out items in an organism's heredity reduce it to greater simplicity ending in parasitic helplessness. These master molecules are the genes, long known as the chemical units that control the hereditary process.

This master-molecule theory of evolution was laid before the meeting of the National Academy of Sciences in Washington by Prof. George W. Beadle of the California Institute of Technology.

A simple organism, by adding gene to gene through succeeding generations, can finally build up a complex of some 10,000 genes, Prof. Beadle stated. The interaction of the genes in so great a complex as this would be sufficient to account for the structural and behavior patterns of the most advanced of plants or animals.

On the other hand, by dropping gene after gene through many generations, an organism can become so simple, even degenerate, that in the end it is a virus —a living or quasi-living chemical something that can hardly claim the name of organism. If a virus is not a gene that has lost all powers except that of living at some other being's expense, it at least has a close resemblance to a lone, lost gene.

Prof. Beadle was started on his new outlook on the evolutionary process through his researches on the genetics of the mold-fungus Neurospora, which have already attracted wide attention. He has succeeded in keeping alive strains of this fungus that have taken the first step towards that ultimate simplification that is just short of annihilation, by supplying them with certain protein-building molecules known as amino-acids, which they have lost the power of producing for themselves, through the dropping out of genes.

Science News Letter, May 8, 1948

PHOTOGRAPHY

New Fast X-Ray Movies

➤ SUPER-SPEED X-ray movies which take pictures faster than you can blink an eye were shown the American Physical Society meeting in Washington.

Dr. Charles H. Slack, director of research for the Westinghouse Lamp Division, said some of the possible uses of the new X-ray movies include:

Visible evidence of the fastest-moving organs within the body for study by doctors.

X-ray movies of persons walking and running to aid orthopedists, chiropodists and shoe manufacturers.

Pictures of the burning action of fuel in a rocket.

Solving the industrial mysteries of how metal is deposited from an arc welding rod and how molten metal flows into a casting mold.

The physicists were shown a 15-second movie of what happens when a violent chemical reaction takes place. The super-speed X-ray film revealed details of the complex reaction.

X-ray exposures of ten millionths of a second are teamed with a shutterless camera shooting movies at 100 frames a second in the new equipment. Movies at 150 frames a second have been made, and Dr. Slack said that 2,000 frames per second may be possible.

With more powerful X-ray tubes, he predicted that car and airplane engines can be inspected from the outside while they are running. This could lead to smoother, safer engine performance.

Super-speed X-ray movies were developed at the Westinghouse Lamp Research Laboratories, Bloomfield, N. J., under contract with the Department of the Navy's Bureau of Ordnance.

Science News Letter, May 8, 1948

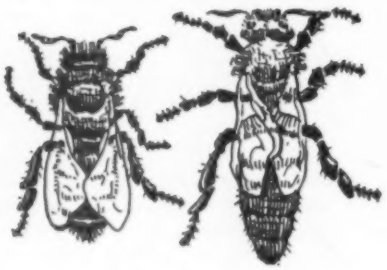
Science Service Radio

➤ LISTEN in to a discussion on "Psychology—Yesterday and Tomorrow" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDST Saturday, May 15. Dr. Walter Bingham, one of the country's leading psychologists, chairman of the Council Advisory to the Director of Personnel, U. S. Army General Staff, will be the guest of Watson Davis, director of Science Service. Dr. Bingham will tell about the many areas of human problems being aided by psychological methods today.

Science News Letter, May 8, 1948

ENTOMOLOGY

NATURE RAMBLINGS
by Frank Thone



Bees' Business

➤ BEES' business is usually measured only in terms of honey production. If that were all bees did for man it would be enough to justify their keep, for the annual production of honey in this country is estimated at 200 million pounds—which is equal to the displacement of a first-class cruiser. At present honey prices, that's really "heavy sugar". And there is also a tidy sideline of beeswax, still an important item in many industries and arts.

But bees work for us in a hundred other ways: our tables would be terribly impoverished if they were to disappear for even one season. The pollinating activity of bees is required for practically all our fruit trees and berry bushes, our melons, squashes, pumpkins and cucumbers, our tomatoes, eggplant and peppers, for the cotton we wear and the tobacco we smoke.

True, some of the plodding staples of our diet need no help from the bees. Potatoes, both white and sweet, are propagated without recourse to seed. The grains and the hay and pasture grasses are wind-pollinated. Buckwheat, however, is commonly rated as a cereal even though it is not a grain, and it requires the services of honey bees to make a crop.

It would really seem more appropriate to anoint our buckwheat cakes with strained honey than with the traditional maple syrup.

Alfalfa, sweet clover and several other clover species, all of which figure importantly in the production of meat and dairy products, need the visits of bees to insure seed for the next sowings. Seedsmen would be hard put to produce seeds for flower and vegetable gardens in a beeless country.

Bees are important to a number of our forest and ornamental trees, though it is true that a majority of our trees are wind-pollinated. Among the bee-visited trees are the locusts, the magnolias, tuliptree, flowering dogwood, sassafras and sourwood. Of all varieties of honey, the honey of the sourwod tree of the Southeast is, in the opinion of many, the most fragrant.

It is no fancy that honey takes on something of the characteristic fragrance of the flowers from which it is produced. When there is a great abundance of flowers of one particular kind in bloom, as in a clover field or an apple orchard, the bees in the vicinity will work on those flowers almost exclusively. If a bee gets started on one kind of flower at the beginning of the day, she will work only on that kind all day long. The result is that the combs are loaded with honey concentrated mainly from the flowers predominant at a given time in the neighborhood.

Science News Letter, May 8, 1948

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organization.

ABBOTT LAWRENCE LOWELL, 1856-1943—Henry Aaron Yeomans—*Harvard University Press,* 564 p., illus., $6.00. The biography of Lowell is also, naturally, a history of Harvard University.

AMERICAN JUNIOR COLLEGES—Jesse P. Bogue, Ed.—*American Council on Education,* 2d ed., 537 p., $6.50. A very useful and comprehensive directory.

APPLIED PHYSICS: ELECTRONICS, OPTICS, METALLURGY—*Little, Brown,* 456 p., illus., $6.00. A history of four divisions of the Office of Scientific Research and Development.

ATOMIC ENERGY, ITS INTERNATIONAL IMPLICATIONS: A Discussion by a Chatham House Study Group—*Royal Institute of International Affairs,* 128 p., paper, $1.25. By a group of men prominent in British political and scientific life.

CARNEGIE INSTITUTION OF WASHINGTON YEAR BOOK No. 46, July 1, 1946-June 30, 1947—*Carnegie Institution of Washington,* 211 p., illus., paper $1.00, cloth $1.50. Reports of investigations in many fields.

DEVELOPMENT AND GROWTH OF THE RATTLE OF THE RATTLESNAKES—Arnold A. Zimmermann and Clifford H. Pope—*Chicago Natural History Museum,* 58 p., illus., paper, 75 cents. The gross studies were supplemented by X-rays of the live snakes.

THE DIGESTIVE TRACT IN ROENTGENOLOGY—Jacob Buckstein—*Lippincott,* 889 p., illus., $16.00. This profusely illustrated volume will serve not only the roentgenologist but also the surgeon and physician as an aid to diagnosis.

FARMERS OF FORTY CENTURIES: Or Permanent Agriculture in China, Korea and Japan—F. H. King—*Organic Gardening Press (Rodale),* 379 p., illus., $5.00. First American edition of a book originally published in England and already familiar to many American readers.

FUNDAMENTALS OF HUMAN REPRODUCTION—Edith L. Potter—*McGraw-Hill,* 231 p., illus., $3.50. Although intended especially for nurses, this book is written in non-technical language so that it can be read by all those with an interest in how we all began.

HOLLYWOOD ON TRIAL: The story of the 10 Who Were Indicted—Gordon Kahn—*Boni & Gaer,* 229 p., paper, $1.00, cloth $2.75. Has a foreword by Thomas Mann. Because the Un-American Activities Committee is also under indictment by many scientists for the Condon affair, this is a timely book for scientists.

INTRODUCTION TO THE DIFFERENTIAL EQUATIONS OF PHYSICS—L. Hopf—*Dover,* 154 p., $1.95. A book for home study intended for physicist and engineer.

MEDICINE IN THE POSTWAR WORLD: The March of Medicine, 1947—*Columbia University Press,* 109 p., $2.00. A group of lectures including discussion of the effect of atomic research on medicine and the new antibiotics.

THE ROCKEFELLER FOUNDATION: A Review for 1947—Raymond B. Fosdick—*Rockefeller Foundation,* 64 p., illus., paper, free from the publisher, 49 West 49th St., New York City. An account of the world-wide activities of this institution.

ROSES FOR EVERY GARDEN—R. C. Allen—*Barrows,* 218 p., illus., $3.50. A book for gardeners on America's favorite flower.

THE SOLAR SPECTRUM, Lambda 6600 to 13495—Harold D. Babcock and Charlotte E. Moore—*Carnegie Institution of Washington,* 95 p., paper, $1.40, cloth $2.00. Results accumulated since 1925 are tabulated for about 7400 spectral lines.

THEORY OF HARMONY: Harmonielehre—Arnold Schoenberg—*Philosophical Library,* 336 p., illus., $7.50. A translation by Robert D. W. Adams of a work by a Viennese musician.

Science News Letter, May 8, 1948

Department store demonstrations show how television makes shopping easier—saves time!

Shopping by Television—a coming convenience

You know television as an exciting source of news and entertainment. But what about its many other uses?

250,000 people—at a demonstration arranged by RCA Victor—learned the advantages of a "Shop-by-Television" program. Television receivers, conveniently located throughout a big store, showed customers what was going on in other departments . . . saved time . . . made shopping simpler.

88% of these customers said television was a major help . . . 62% said the program had drawn them to the store . . . more than half intended to visit departments where televised merchandise was sold. Sales of many televised items jumped 200% above normal!

Beyond its value *within* a store, "Shop-by-Television" is already reaching across the air waves to enter customers' homes. How convenient it will be to *see* merchandise on the screen of your RCA Victor television receiver, and then be able to do much of your shopping by telephone!

Such types of progressive research lead to new uses for radio-electronic products and services, and to the quality you associate with the names RCA, and RCA Victor.

• • •

When in Radio City, New York, be sure to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. *Radio Corporation of America, RCA Building, Radio City, N. Y. 20.*

RCA **RADIO CORPORATION of AMERICA**

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 413. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

TABLE WARMER, to keep food hot on the dining table, is a plastic base topped with a chromed metal grate which contains a smoke-proof, smudge-proof candle that burns six hours. The base easily accommodates any dish, pan or plate normally used in the home.

Science News Letter, May 8, 1948

FLUORESCENT LAMP with the familiar color of incandescent bulbs is designed especially for use in homes and retail stores. It is claimed to have an increased efficiency of approximately 7% over corresponding wattage of standard white fluorescent lamps.

Science News Letter, May 8, 1948

COTTON COVER with a mop fringe at its bottom fits over the straw of any household broom and converts it into a dusting mop for walls and ceilings. The washable bag-like cover is quickly snapped in place, and can be as easily removed.

Science News Letter, May 8, 1948

TRACTION PAD, for use in starting an automobile on ice, is a small flat paper bag of sand with a tab of sandpaper or emery cloth stitched to one end. Placed in front of the wheel with the abrasive tab as far under it as possible, it is drawn under by the rotation of the wheel and the bag of sand is broken.

Science News Letter, May 8, 1948

VACUUM CLEANER, shown in the picture, comes with attachments for cleaning out-of-the-way places, and also attachments to permit its use in spraying insecticides, or liquid wax on woodwork or flooring. It has no dirty bag to empty; the gatherings are just poured out of a metal dust bowl.

Science News Letter, May 8, 1948

FISH LURE, the shape and size of a minnow, contains a tiny battery, electric motor, and water-jet propulsion which gives it relatively slow motion. Imitation frogs and ducks with the same propulsion equipment are toys for children.

Science News Letter, May 8, 1948

CRIB ATTACHMENT, a combination toy and exerciser for the baby that is fastened from side to side of the rails, has an upright animated figure, such as a chicken, with cords attached for the youngster to grasp. By pulling a cord, the figure is turned around on a pivot.

Science News Letter, May 8, 1948

AIR CUSHION pad for gunstocks, recently patented, fits on the butt between it and the shoulder and eases the "kick" on the body when the gun is fired. It is the shape and size of the shoulder end of the gun and is held in place by a resilient boot that fits snugly the sides of the stock.

Science News Letter, May 8, 1948

Question Box

AGRICULTURE

What are some of the advantages expected from scattering seed by planes? p. 298.

ASTRONOMY

According to the latest theory, what happened to the four planets closest to the sun? p. 293.

BIOLOGY

What role does the cytoplasm play in heredity? p. 295.

ELECTRONICS

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GENETICS

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GEOLOGY

How will scientists find out the earth's early magnetism? p. 297.

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PSYCHOLOGY

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PUBLIC HEALTH

How can we, as a nation, be healthier ten years from now? p. 296.

Photographs: Cover, Brookhaven National Laboratory; p. 291, U. of California; p. 293, Eastman Kodak Co.; p. 294, p. 295, Fremont Davis; p. 298, p. 299, Western Ways.